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REMARKS

This is intended as a full and complete response to the Office Action dated October 31, 2000, having a shortened statutory period for response extended one month to expire on February 28, 2001. Claims 1-23 are pending in the application. Claims 10-23 have been withdrawn from further consideration as being drawn to a non-elected species. Applicant reserves the right to prosecute the non-elected species if a generic claim is found allowable. In this response, claims 1-23 have been canceled without prejudice. Claims 24-45 have been added to re-organize the language of the claims for clarity purposes and not for patentability reasons. Claims 24-33 are intended not to be interpreted under 35 U.S.C. § 112, sixth paragraph. Claims 34-45 are intended to be interpreted under 35 U.S.C. § 112, sixth paragraph. The amendments are all supported by the specification and do not introduce new matter.

Claims 1-23 stand restricted as follows:

Group I: Claims 1-9, drawn to a method, classified in class 427, subclass 331.

Group II: Claims 10-17, drawn to an apparatus, classified in class 118, subclass 715.

Group III: Claims 18-23, drawn to a product classified in class 428, subclass 698.

Applicant confirms election of claims 1-9 with traverse. In this response, Applicant has canceled claims 1-23 and has added claims 24-45 directed to Group I of the restriction requirement. Applicant respectfully requests withdrawal or modification of the restriction requirement.

Claims 3-4 and 7-9 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has canceled claims 3-4 and 7-9 and has added new claims in this response, and respectfully submits that the rejection has been obviated. Withdrawal of the rejection is respectfully requested.

Claims 1, 3, 5-7 and 9 stand rejected under 35 U.S.C. § 102(b) over *Gartner et al.* (US. Patent No. 4,965,090) on grounds that *Gartner et al.* discloses an intermediate plasma treatment step using a sequence of plasma with different gases including an Ar plasma, without O₂ or H₂. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Gartner et al.*

Gartner et al. discloses intermediate plasma treatments during the deposition of a layer of W and Sc₂O₃ for use as a coating of a cathode tube. (col. 1, lns. 47-62.) The plasma gas used is

an inert gas used together with an oxidizing gas. (col. 2, lns. 18-21.) The multiple intermediate plasma treatments are performed between the deposition of multiple thin layers of W/Sc₂O₃ to form a thick layer of W/Sc₂O₃. (col. 2, lns. 22-25; col. 3, lns. 32-40.) *Gartner et al.* does not teach, show, or suggest treating a layer on a semiconductor substrate. In addition, *Gartner et al.* does not teach, show, or suggest depositing a first layer comprising a material selected from the group consisting of organic polymeric materials, α C, α FC, SiCO:H, and SiC. Furthermore, *Gartner et al.* does not teach, show, or suggest depositing a second layer over the first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 4 and 8 stand rejected under 35 U.S.C. § 103(a) over *Gartner et al.* on grounds that it would have been obvious to use any of the class of inert gases and on grounds that it would have been obvious to determine what plasma parameters would be appropriate by routine experimentation. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Gartner et al.* and are in condition for allowance for the reasons discussed above.

Claims 1-2 and 9 stand rejected under 35 U.S.C. § 102(b) over *Higashi et al.* (U.S. Patent No. 4,361,638) on grounds that *Higashi et al.* discloses deposition of Si and C by a glow discharge. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Higashi et al.*

Higashi et al. discloses depositing a photoconductive layer comprising Si and C by glow discharge decomposition of precursor gases or by glow discharge sputtering of a Si/C target. (col. 4, lns. 3-29.) The photoconductive layer may be electrified by a corona discharge to form a static latent image. (Examples 2 and Example 3). *Higashi et al.* does not, however, specify in what atmosphere the corona discharge is conducted in. Therefore, *Higashi et al.* does not teach, show, or suggest exposing a layer to a plasma consisting essentially of an inert gas. In addition, *Higashi et al.* does not teach, show, or suggest treating a layer on a semiconductor substrate. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1-2 and 9 stand rejected under 35 U.S.C. § 102(b) over *Nguyen et al.* (U.S. Patent No. 5,549,935) on grounds that *Nguyen et al.* discloses that gases such as C₂F₄ are inputted under

RF power over a substrate with an initially applied coating that may be silicon carbide. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Nguyen et al.*

Nguyen et al. discloses that a layer of silicon or a metal silicide is deposited over a substrate to improve adhesion of a polymeric fluorocarbon film over the substrate. (col. 2, lns. 30-39.) The adhesion is improved by causing bonding of the Si in the silicon or the metal silicide layer with the carbon in the polymeric fluorocarbon film. (col. 2, ln. 30 to col. 3, ln. 9.) An argon plasma may be used to form dangling silicon bonds in the silicon or metal silicide layer for later deposition of the polymeric fluorocarbon film. (col. 2, ln. 58 to col. 3, ln. 9.) The polymeric fluorocarbon film can be deposited by a plasma chemical vapor deposition. (col. 5, ln. 50 to col. 6, ln. 20.) The silicon or the metal silicide layer of *Nguyen et al.* is not, however, a layer comprising a material selected from the group consisting of organic polymeric materials, αC , αFC , SiCOH , and SiC . Furthermore, the polymeric fluorocarbon film of *Nguyen et al.* is not exposed to a plasma to improve adhesion of a second layer deposited thereover. As a consequence, *Nguyen et al.* does not teach, show, or suggest depositing a first layer comprising a material selected from the group consisting of organic polymeric materials, αC , αFC , SiCO:H , and SiC , exposing the first layer to a plasma, and depositing a second layer over the first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1, 3, and 9 stand rejected under 35 U.S.C. § 102(b) over *Sandhu* (U.S. Patent No. 5,576,071) and claims 4 and 8 stand rejected under 35 U.S.C. §103(a) on grounds that *Sandhu* discloses a hydrogen plasma treatment. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Sandhu*.

Sandhu discloses a reducing hydrogen plasma treatment of a TiN layer deposited by an organic precursor of TDMAT. (col. 3, ln. 55 to col. 4, ln. 34.) The hydrogen is flowed in with a carrier gas of either N_2 or Ar or flowed in as NH_3 . (col. 4, lns. 9-41.) The hydrogen plasma treatment is performed after multiple depositions of layers of TiN to form one layer of TiN. (col. 4, ln. 49 to col. 5, ln. 41.) *Sandhu* does not, however, teach, show, or suggest depositing a layer comprising a material selected from the group consisting of organic polymeric materials, αC ,

α FC, SiCO:H, and SiC. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1, 3, 5 and 9 stand rejected under 35 U.S.C. § 102(e) over *Chittipeddi et al.* (U.S. Patent No. 5,972,179) on grounds of the cited portions of the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Chittipeddi et al.* *Chittipeddi et al.* discloses a N₂ and a H₂ plasma treatment of a CVD TiN layer for subsequent deposition of a PVD TiN layer. (col. 4, lns. 24-30) Titanium oxynitride can be formed by bleeding in oxygen during plasma passivation. (col. 5, lns. 2-4.) *Chittipeddi et al.* does not, however, teach, show, or suggest depositing a layer comprising a material selected from the group consisting of organic polymeric materials, α C, α FC, SiCO:H, and SiC nor does *Chittipeddi et al.* teach, show, or suggest exposing the layer to a plasma consisting essentially of an inert gas. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1 and 5 stand rejected under 35 U.S.C. § 102(b) over *Ouellet* (U.S. Patent No. 5,270,267) on grounds of the cited portions of the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Ouellet*. *Ouellet* discloses depositing a spin-on-glass of siloxanes and silicates. (col. 3, lns. 53-55.) The spin-on-glass is treated in an oxygen gas plasma. (col. 3, lns. 24-29) *Ouellet* does not, however, teach, show, or suggest depositing a layer comprising a material selected from the group consisting of organic polymeric materials, α C, α FC, SiCO:H, and SiC nor does *Ouellet* teach, show, and suggest exposing the layer to a plasma consisting essentially of an inert gas. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1-3, 7 and 9 stand rejected under 35 U.S.C. § 102(b) over *Malaczynski et al.* (U.S. Patent No. 5,458,927) on grounds of the cited portions of the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Malaczynski et al.* *Malaczynski et al.* discloses forming a carbon coating over an aluminum-silicon workpiece by treating the workpiece with an argon gas plasma or an inert gas plasma. (col. 2, ln. 23 to col.3, 38.) The carbon coating is formed to create a wear resistant carbon coating. (col. 3, lns. 46-58)

Malaczynski et al. does not, however, teach, show, or suggest treating a layer on a semiconductor substrate. Furthermore, *Malaczynski et al.* does not teach, show, or suggest depositing a first layer comprising a material selected from the group consisting of organic polymeric materials, α C, α FC, SiCO:H, and SiC nor does *Malaczynski et al.* teach, show, or suggest depositing a second layer over the first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1, 5, and 9 stand rejected under 35 U.S.C. § 102(b) over *Sato et al.* (U.S. Patent No. 4,957,591) on grounds of the cited portions in the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Sato et al.* *Sato et al.* discloses a plasma treatment of a diamond surface to change the morphology of the diamond surface. (col. 2, lns. 20-30; col. 5, ln. 65 to col. 6, lns. 59.) The plasma gas can be oxygen, carbon dioxide, hydrogen, a halogenated hydrocarbon, or a halogenated carbon. (col. 2, lns. 20-30.) The diamond surface can be used for a variety of applications as a surface layer. (col. 6, lns. 10-55.) *Sato et al.* does not, however, teach, show, or suggest depositing a second layer over a first layer. Furthermore, the reference does not teach, show, or suggest exposing the layer to a plasma consisting essentially of an inert gas. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1 and 3-4 stand rejected under 35 U.S.C. § 102(b) over *Ueda et al.* (U.S. Patent No. 5,540,957) on grounds of the cited portions in the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Ueda et al.* *Ueda et al.* discloses forming a magnetic recording medium by exposing a glow discharge plasma to a hard carbon film to deposit a modified layer and by depositing a lubricant layer on the modified layer. (col. 2, lns. 25-36.) The discharge plasma comprises a mixture gas of nitrogen involving organic gas and inorganic gas or involving organic gas, hydrocarbon gas, and inorganic gas. (col. 2, lns. 25-36; col. 3, lns. 47-67.) The substrate used comprises polyethylene terephthalate (PET). (col. 3, lns. 4-8.) *Ueda et al.* does not teach, show, or suggest treating a layer on a semiconductor. Furthermore, *Ueda et al.* does not teach, show, or suggest exposing the layer to a plasma consisting essentially of an inert gas subsequent to deposition. Therefore, Applicant respectfully

submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1 and 3-7 stand rejected under 35 U.S.C. § 102(b) over *Bagley et al.* (U.S. Patent No. 4,289,798) on grounds of the cited portions in the references. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Bagley et al.* *Bagley et al.* discloses a corona discharge method of producing a coating for floor coverings having a reduced gloss level by curing a polymeric liquid. (col. 1, ln. 17 to col. 2, ln. 19.) Gases used in the corona discharge device consists of argon, carbon dioxide, nitrogen, helium, nitrous oxide, carbon tetrafluoromethane, sulfur hexafluoride, argon and nitrogen, argon and nitrous oxide, or helium and carbon dioxide. (col. 3, ln. 60 to col. 4, ln. 18.) *Bagley et al.* does not, however, teach, show, or suggest treating a layer on a semiconductor substrate. Furthermore, *Bagley et al.* does not teach, show, or suggest depositing a second layer over a first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1, 3 and 5 stand rejected under 35 U.S.C. § 102(b) over *Yesuda et al.* (U.S. Patent No. 4,980,196) on grounds of the cited portions in the references. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Yesuda et al.* *Yesuda et al.* discloses improving the corrosion resistance of steel by pretreating the steel with a plasma and then depositing a polymer over the steel. (col. 3, lns. 4-44.) The plasma gas can be oxygen, an inert gas, air, hydrogen, nitrogen, argon, or water vapor. (col. 4, lns. 41-46.) *Yesuda et al.* also discloses posttreating the steel with a plasma to enhance the adhesion of a primer coating. (col. 3, lns. 4-44; col. 7, lns. 3-26.) The plasma gas can be oxygen, water, carbon dioxide, or ammonia with or without inert gases. (col. 6, lns. 45-48.) *Yesuda et al.* does not, however, teach, show, or suggest treating a layer on a semiconductor substrate. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claim 1 stands rejected under 35 U.S.C. § 102(b) over *Nichols et al.* on grounds of the cited portions in the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Nichols et al.* *Nichols et al.* discloses glow discharge polymerization of a first

and a second coating to encapsulate electrodes, integrated circuits, semi-conductors, and other electronic components. (col. 4, lns. 27-44.) The substrate or the first coating is first treated with an inert gas plasma. (col. 5, lns.1-2; col. 12, ln. 18 to col. 12, ln. 4.) Adhesion of the primer coating to the substrate has been found to be a function of the power input, monomer flow rate, and average plasma gas molecular weight during deposition. (col. 8, lns. 13-16.) *Nichols et al.* does not teach, show, or suggest exposing a first layer comprising a material selected from the group consisting of organic polymeric materials, α C, α FC, SiCO:H, and SiC and depositing a second layer over the first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Claims 1 and 3 stand rejected under 35 U.S.C. § 102(b) over *Zhao et al.* on grounds of the cited portions in the reference. Applicant respectfully submits that the rejection has been obviated by the cancellation of the claims and respectfully submits that the added new claims are patentable over *Zhao et al.* *Zhao et al.* discloses utilizing an argon and hydrogen gas plasma to clean and remove material from a substrate, especially after an etching step. (Abstract; col. 1, ln. 10 to col. 2, ln. 23) *Zhao et al.* does not teach, show, or suggest depositing a second layer over a first layer. Therefore, Applicant respectfully submits that the claims are in condition for allowance and respectfully request allowance of the claims.

Submitted with this response in a Supplemental Information Disclosure Statement are two references U.S Patent No. 6,054,206 (Mountsier) and German Patent Application No. 196 54 737 A1 (Toshiba). Applicant submits that the added new claims are patentable over the new references because the references do not teach, show, or suggest a plasma consisting essentially of an inert gas.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or process of the present invention. Having addressed all issues set out in the office action, applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



Keith M. Tackett

Registration No. 32,008

THOMASON, MOSER & PATTERSON, L.L.P.

3040 Post Oak Blvd., Suite 1500

Houston, TX 77056

Telephone: (713) 623-4844

Facsimile: (713) 623-4846

Attorney for Applicant